

- [c9] 9.A system for registering images using retrospective gating, the system comprising:
- an imaging system;
 - an object disposed so as to be communicated with said imaging system,
- wherein said imaging system generates image data responsive to said object;
- and
- a processing device, wherein said processing device executes a method comprising:
- determining a target area of interest;
 - obtaining scout image data responsive to said target area;
 - processing said target area so as to create a sub-target area of interest;
 - computing a desired image acquisition time;
 - operating the imaging system so as to create image data responsive to each said sub-target area;
 - combining said image data for each of said sub-target areas to create a set of image data;
 - processing said image data to determine a phase of said image data; and
 - synchronizing said image data.
- [c10] 10. The system of Claim 9 wherein said sub-target area corresponds to a size of a detector in a selected axis.
- [c11] 11. The system of Claim 9 wherein said target area of interest corresponds to a size of a target.
- [c12] 12. The system of Claim 9 wherein said set of image data corresponds to said target area of interest.
- [c13] 13.The method of Claim 9, wherein said target area of interest is associated with an object to be imaged.
- [c14] 14. The method of Claim 9 wherein said synchronizing includes utilizing said phase to correlate image data.
- [c15] 15.A storage medium encoded with a machine-readable computer program code for registering images acquired using an imaging system with respiratory

gating, said medium including instructions for causing controller to implement a method comprising:

- determining a target area of interest;
- obtaining scout image data responsive to said target area;
- processing said target area so as to create a sub-target areas of interest;
- computing a desired image acquisition time;
- operating the imaging system to create image data responsive to each of said sub-target areas;
- combining said image data for each of said sub-target areas so as to create a set of image data;
- processing said image data to determine a phase of said image data; and
- synchronizing said image data.

[c16] 16. The storage medium of Claim 15 further comprising computer program code wherein said operating includes establishing an acquisition time for said image data corresponding to a physiological cycle plus at least one of two thirds of a gantry rotation time and one gantry rotation time.

[c17] 17. The storage medium of Claim 15 further comprising computer program code wherein said method further includes:
synchronizing PET emission data utilizing said phase.

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18.A computer data signal, said computer data signal comprising code configured to cause a controller to implement a method for registering images acquired using an imaging system with respiratory gating, the method comprising:

- determining a target area of interest;
- obtaining scout image data responsive to said target area;
- processing said target area so as to create a sub-target areas of interest;
- computing a desired image acquisition time;
- operating the imaging system to create image data responsive to each of said sub-target areas;
- combining said image data for each of said sub-target areas so as to create a set of image data;

processing said image data to determine a phase of said image data; and
synchronizing said image data.

[c19] 19. The computer data signal of Claim 18 further comprising computer program code wherein said operating includes establishing an acquisition time for said image data corresponding to a physiological cycle plus at least one of two thirds of a gantry rotation time and one gantry rotation time.

[c20] 20. The computer data signal of Claim 18 further comprising computer program code wherein said method further includes:
synchronizing PET emission data utilizing said phase.

[c21] 21. A system for registering images using retrospective gating, the system comprising a:
means for determining a target area of interest;
means for obtaining scout image data responsive to said target area;
means for processing said target area so as to create a sub-target area of interest;
means for computing a desired image acquisition time;
means for operating said imaging system to create image data responsive to each said sub-target area;
means for combining said image data for each of said sub-target areas to create a set of image data;
means for processing said image data to determine a phase of said image data;
and
means for synchronizing said image data.

[c22] 22. The system of Claim 21 further comprising said means for operating including means for establishing an acquisition time for said image data corresponding to a physiological cycle plus at least one of two thirds of a gantry rotation time and one gantry rotation time.

[c23] 23. The system of Claim 21 further comprising:
means for synchronizing PET emission data utilizing said phase.

[c24] 24. A method for assigning phases in images acquired using an imaging system

